

Read also some "Notes on the Habits of the common Garden Ant, *Formica nigra*, L." By George Daniell, Esq. Communicated by the Secretary.

This ant infests in large numbers Mr. Daniell's garden at Chobham. Stragglers appear in the greenhouse about the middle of February, and they had this season become numerous by the 5th of March: as the weather becomes warmer they spread themselves all over the garden. In fine weather they bring forth their white pupæ and spread them in little heaps in the sun by the side of a turf, stone, or garden-pot; not unfrequently forming their dwellings in the bottom of the flower-pots among the roots of the plants. As the summer advances they even extend their colonies into the meadows, and form small round hillocks among the grass. They are very pugnacious and defiant, and do not hesitate to attack flies, gnats, and even bees. A number of them were on one occasion seen clustering round a honey-bee, and on being struck off with the finger-nail, they returned to the charge in the most fearless and daring manner, and eventually dragged off the bee. Last year, when the vines were much infested with the *scale*, or *Coccus Vitis*, L., thousands of ants clustered on the trunks of the vines, apparently feeding on the black excrement voided by this pest. In the same manner they feed around the green *Aphides*, which more particularly infest the *Calceolarias*. Not only the cast skins of the *Aphides*, but the insects themselves, are carried off by the ants. The *Aphides* appear to be comparatively safe while buried beneath the long hairs of the *Calceolarias*, and other similar plants; but the ants evidently make great efforts to dislodge them, while the *Aphides* parry the attack with their legs. On shaking the plants and dislodging some of the *Aphides*, the latter were immediately set upon by the ants below, which first broke their legs and stripped them of their wings, and then carried them off. The winged female ants are seen in June, not however using their wings much in flight, but quivering and shaking them as they walk along, each accompanied by several workers.

#### ROYAL SOCIETY.

November 16, 1854.—Col. Sabine, R.A., in the Chair.

"Observations on the Respiratory Movements of Insects." By the late William Frederick Barlow, F.R.C.S. Arranged and communicated by James Paget, F.R.S.

This essay contains the greater part of a series of observations made between 1845 and 1850. The following are some of the conclusions which they plainly indicate:—

(1.) The respiratory movements of Dragon-flies (*Libellulæ*), and, probably, of other insects also, are naturally subject to considerable and frequent variations in force and rate, the causes of many of these variations being as yet unknown.

(2.) The respirations of these insects are always quickened by exercise, emotion, rise of temperature, galvanism, and mechanical irritation; and the last three agents quicken them in the decapitated, as well as in the perfect, insect.

(3.) The respiratory movements of each segment of the trunk are, in some measure, independent of those of the rest, although in the perfect insect they concur in all the segments. They continue to be performed, though feebly and slowly, in separated segments, provided their nervous cords and ganglia are entire: and they may be abolished in single and successive segments by the local action of chloroform.

(4.) The removal of the head, including the supra- and sub-œsophageal ganglia, does not, like the removal of the medulla oblongata of the vertebrate animal, put a stop to the respiratory movements of the insect; but it diminishes their frequency and force, and deprives them of all influence of the will and of mental emotions.

(5.) The shock inflicted by the sudden destruction of the head, or of the terminal part of the abdomen, generally stops all the respiratory movements of the insect for a time, and much enfeebles them during the remainder of its life.

(6.) The general tendency of the observations is to corroborate the opinion of the self-sufficiency of the several ganglia for the movements of their appropriate segments, and, thus far, to maintain the belief in their essential independence. At the same time, the observations on the diffused influence of shocks accord with those of the coordinate similar movements of all the segments, in proving their close mutual relations and mutual influence.

“On the Structure of some Limestone Nodules enclosed in Seams of Bituminous Coal, with a Description of some Trigonocarpon contained in them.” By J. D. Hooker, M.D., F.R.S., and E. Binney, Esq.

The authors first describe the occurrence of the limestone nodules, which form a continuous bed in the centre of a thin seam of bituminous coal in the lower part of the Lancashire coal-field. The nodules were of various sizes, some weighing many pounds, and caused the coal to bulge out both above and below them, and they were found to be entirely composed of vegetable tissues converted into carbonate of lime and magnesia. Their formation is supposed by the authors to be due to infiltration of water through the superincumbent shales, which were full of fossil shells supposed to be of marine origin, and the aggregation of the mineral matter round centres of vegetable remains. The chemical constituents of the nodules were found to be carbonates of lime and magnesia, sesquioxide and sulphate of iron, with a little carbonaceous matter.

The probability of these nodules representing an average sample of the vegetable constituents of the surrounding coal is then discussed, and attention is drawn to the very great interest and importance that would attach to them were such a view substantiated, as showing the exact nature of the association of plants which is capable of conversion into bituminous coal.

All the plants contained in the nodules were common in other parts of the coal formation, viz. *Culamodendron*, *Halonina*, *Sigillaria*, *Lepidodendron*, *Stigmaria*, *Trigonocarpon*, *Anabothra*, and others; of these the first-named genus occurred in the greatest abundance and

as large fragments of fossil wood. Very many of the specimens were sliced, and being reduced to very thin transparent sections, were examined with the view of determining the botanical character of their contents, and the intimate structure of the masses of more or less homogeneous aspect to which they were reduced by decomposition, previous to or during the operation of calcification. The results were very satisfactory, and seemed to indicate that all traces of vegetable structure may be completely obliterated in the substance of highly bituminized coal, which may nevertheless also contain fragments of wood with their tissues preserved.

An account is then given of the examination of the details of structure of *Trigonocarpon*, and this, as well as the comparison of *Trigonocarpon* with the modern genus *Salisburia*, is illustrated by drawings and analyses.

The authors are still engaged with the study of these nodules, with the view of showing the relationship between *Calamodendron*, *Calamites*, *Sigillaria* and *Anabothra*, and the details are preparing for publication.

#### BOTANICAL SOCIETY OF EDINBURGH.

December 14, 1854.—Professor Balfour, President, in the Chair.

The Secretary was directed to enter upon the minutes, an expression of the Society's sense of the great loss which science had sustained in the sudden and unexpected death of Professor Edward Forbes, and of their sympathy with his family in the bereavement.

Office-bearers for the ensuing year were elected, as follows:—

*President*.—Professor Balfour.

*Vice-Presidents*.—Dr. Sellar; Henry Paul, Esq.; James Cunningham, Esq.; Charles Jenner, Esq.

*Council*.—James M'Nab, Esq.; Dr. Priestley; Dr. W. H. Lowe; Professor Blackie; William Ivory, Esq.; G. R. Tate, Esq., Professor Fleming; Professor Simpson; John Lowe, Esq.; Robert Daw, Esq.

*Honorary Secretary*: Dr. Greville.—*Foreign Secretary*: Dr. Douglas Maclagan.—*Auditor*: William Brand, Esq.—*Treasurer*: William W. Evans, Esq.—*Curator of Museum*: George S. Blackie, Esq.—*Artist*: Neil Stewart, Esq.—*Assistant-Secretary and Curator*: Mr. G. Lawson.

Dr. Balfour read an extract from a letter he had received from Dr. W. A. White, Assistant Surgeon 47th Regiment, dated "Camp before Sebastopol, Nov. 17, 1854," accompanying seeds of a superior melon he had gathered in the orchards on the banks of the Katscha. "All who visited those orchards were surprised at the extraordinary abundance and variety of the fruit-trees. Very many different varieties of the apple and pear, peaches, apricots, nectarines, quinces, the plum, the cherry, the walnut, the almond, the fig, were growing in the greatest profusion within the space of an acre, whilst the surrounding vineyards were laden with the finest grapes. Vegetables too were in great abundance, the enormous size of which excited our surprise, considering the little apparent amount of labour expended